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The Greendale Oak and Welbeck Abbey.

A PORTRAIT of the Greendale Oak, representing the tree as it appears to-day, is published on page 239. The Greendale Oak is familiar by name at least to most persons who take any interest in the venerable or otherwise remarkable trees of England. It was a tree of such unusual size 176 years ago that the then Duke of Portland laid a wager that he had in his park at Welbeck a tree so large that he could drive a carriage and four through a hole cut in the trunk. He won his bet and ruined one of the most remarkable trees in Europe, which, in spite of this barbarous mutilation at the hands of the noble proprietor of Welbeck, has continued to exist almost in the same condition that it appears to have been in 1775, when the drawing of it was made that was published eleven years later in Hunter's edition of "Evelyn's Sylva." Another portrait of the tree appeared in Hayman Rook's "Description and Sketches of Some Remarkable Oaks in the Park at Welbeck," a rare and interesting book, published in London in 1790. Rook states that the Greendale Oak was "thought to be above 700 years old; and that, from its appearance, there is every reason to suppose that it had attained to that age at least." He gives the following statistics of its size: Circumference of the trunk above the arch, thirty-five feet three inches; height of the arch, ten feet three inches; width above the middle, six feet three inches; height of the top branch, fifty-four feet. The tree has probably increased very little since these measurements were made just a century ago, although we have not, unfortunately, any recent authoritative measurements with which to compare them. The archway, however, has certainly been much narrowed by the extension of the bark round the edges of the cut since the Duke drove his carriage and four through it. Another portrait, somewhat idealized, of the Greendale Oak appears on the title page of Strutt's noble "Sylva Britannica," in which are gathered the portraits of the most venerable and most interesting trees of Great Britain.

The Duke, who ruined this fine tree to win an after-dinner bet, was not the only eccentric owner, to use a very mild expression, of Welbeck Abbey; and to the late Duke belongs the somewhat equivocal honor of having spent more money badly on a country estate than any man whose operations are accurately known. He enjoyed the title during twenty-five years only, but he spent in that time at Welbeck not less than $35,000,000. Money was never spent more foolishly or with less results, and much of it disappeared underground. An old high-road crossed the park within sight of the windows of the Abbey. The Duke did not like his privacy encroached upon, so he carried the road through a tunnel a mile and a half long and leading right under the lake to a point where it could not be seen from the mansion, and where the traveler was allowed to emerge again into the light of day. This tunnel, arched with brick, made water-tight with cement and lighted day and night with gas, was an expensive affair. But the Duke, having once got the taste for burrowing, kept at it until he had made a vast picture gallery 158 feet long below the surface of the ground, connected with a great underground ball-room and joined with the mansion by long subways. Other subways lead to a great underground kitchen and to the stable a mile away. The conservatories were all underground, too, and the tired and astonished visitor may wander for miles through passages lighted only from occasional bull's-eyes placed at a level with the surface of the ground. Great sums of money were spent in building. A new wing was added to the Abbey, which was flanked by a broad, flat terrace leading down to the lake, a long, narrow sheet of artificial water, with margins bare of vegetation and marked by formal edge stones. A mile from the house and between it and the gardens are grouped a number of great stone buildings erected by the Duke. He never drove and rarely rode, but his stables had accommodations for 200 horses. The riding-school, the finest in Europe, it is said, is roofed with glass, and is 385 feet long and 104 feet wide. Eight thousand gas jets are provided to light it in case it is ever used at night. A tan gallop, enclosed in brick and covered with glass, 1,240 feet long, in which horses can be exercised in bad weather, stands near the riding-school; and not far away are coach-houses and farm-buildings, a poultry-yard, a timber-yard with a saw-mill, the house of the manager of the estate, and a club-house with a reading-room for the use of the working-people. The kitchen-garden and forcing establishment occupy eighteen acres, surrounded with a solid brick wall eighteen feet high. There are miles of glass in this enclosure, and some of the best fruit-trees in England. Seventy-five men keep this garden and the grounds about the mansion in order, and the work is well done. It would be hard to find a garden in better order or one more productive of good crops of fruit and vegetables of the highest quality; but outside the garden there is little of real interest on the estate.

The old Duke was all alone in the world. There was no one to help him waste his millions or to enjoy the results he thought he obtained; no kinsman or friend was allowed to cross his threshold; the only people he saw were the workmen who built up and pulled down at his command, and kept delving deeper and deeper into the ground. When his time came to die it was not even at Welbeck that the messenger found him. Was there ever a sadder spectacle of misdirected energy, of wasted fortune, of fruitless striving! That most of the money spent at Welbeck by this eccentric old man was wasted, there can be no doubt; for Welbeck Abbey, in spite of the millions which have been lavished on it, is one of the least attractive of the great homes of England. The house is set down in a hole, close to the ugly, formal lake, and the only view it commands is across the lake, and this view is ruined by a pair of ugly copper gates standing right in the middle distance, without other support than that afforded by a low metal boat-house. The view of this part of the park would, without this blot, be fine, as many such English park views are fine, from the natural grouping of the old trees they contain, and from the great bands of

deer which enliven them. But apart from this one view across the park, there is nothing at Welbeck to delight the eye of the lover of Nature or of natural beauty. The architecture is cold and monotonous, and the trees are, as a rule, small and in poor condition. Welbeck, however, as it exists, affords one of the most useful object-lessons in Europe, for it shows as no other country-place can show that the mere expenditure of money, unaided by taste and judgment, is powerless to accomplish any results in landscape-gardening of real or permanent value; and no American can see Welbeck and all its ghastly splendors without finding cause of congratulation for the laws and customs of his native land, which make such establishments impossible here. Welbeck is the principal although much the least interesting of the four great estates created on what was once Sherwood Forest (see page 197), and known as "the Dukeries."

IT is rather a remarkable fact, which perhaps some of our readers will be able to explain, that there is now nowhere in the United States any one distinguished for a knowledge of cultivated Roses. Rosarians, as they are called in England, are common enough there, and their patient researches and their zeal in gathering and disseminating knowledge about Roses has been of the greatest service in increasing the taste for the cultivation of the queen of flowers. It is hardly conceivable that the rose does not hold the first place among flowers in the affection of the people of this country. She must still be queen by right and by tradition, although some newer favorites, like the Chrysanthemum, may appear to press her hard for a time. No people in the world buy so many roses as ours, and although fashion and love of display may have something to do with the great prices often paid for these flowers in winter, a real love of roses for their own sake is the true reason of their popularity.

American florists grow roses, especially under glass in winter, to perfection, and the best products of their skill are hardly to be matched anywhere. One can be a good commercial grower of roses and yet have only a limited knowledge of a comparatively few varieties, and the professional florist from a business point of view need only know how to draw from these the best money returns. What is really needed, however, in the interest of horticulture here is some one with leisure and opportunity to take up and carry on systematically the study of Roses where Parkman and Ellwanger have left the subject. The field is an inviting one. The possibilities of Rose-culture in this country are great, and so are the possibilities of improving the various races of the Rose to meet the demands of the different climatic conditions in various parts of the country. What a tempting field California and our southern States offer to the enthusiastic rosarian! There is much to learn, too, of the possibilities of Rose-culture in the trying climates of the northern States. Certainly there is not now in American horticulture any other field where careful study is so much needed as in that offered by the Rose, and no other where intelligent investigation in the right spirit will find so little competition, or can do more useful work or earn for the investigator a more agreeable reputation.

The Mandioca.

IN an economic point of view the Mandioca, or Manioc, is one of the most important agricultural productions both of Brazil and Paraguay. It takes the place of wheat in the northern continent, furnishing the inhabitants with an abundant, cheap and nutritious breadstuff, yielding an enormous quantity of material all the year round. With this the people are independent of the rest of the world for food. Here, in Paraguay, I do not know how they could get along without it. Corn, or maize, as it is generally called, is indeed raised, but it is a somewhat uncertain crop, and needs more cultivation than the native Paraguayans are disposed to give to anything which requires care. Their chief article of subsistence, therefore, is this wholesome and easily raised root, which the laziest people on earth can have with scarcely any labor.

As found here, the Mandioca is of two forms or species, each of which has several varieties. One of these, which has borne various botanical names, such as *Manihot Aipé*, *Manihot palmata*, *Janipha Læflingii*, and *Jathropha dulcis*, but called by the Paraguayans "*Manioca dulce*," is the most common. The other, known to the natives as "*Manioca brava*" (*Manihot utilissima* of botanists), is not so frequently cultivated, though it is often seen in the fields. The sweet Mandioca forms the principal article of diet of the common people, as its roots are entirely innocuous. They may be used as a vegetable for the table, equaling the potato or parsnip, which they much resemble. Boiled for table use, they are white, sweet and palatable. All foreigners take to them at once. They may be fed to animals in the raw state, and are greedily eaten by cattle without injury. They are full of starch; indeed, that is the ingredient which renders the Mandioca so valuable, and the roots are frequently used as is the potato in our own country, for the manufacture of this important commercial and domestic necessity. The roots are grated or ground into powder, and, after the juice is expressed, dried in the sun or on plates over a fire, and thus made into flour, which forms an excellent bread when baked. The Paraguayan method is to knead the bread with new cheese or ground rice, melted fat, salt, water, and a little coriander seed, prepare it in long cylindrical rolls or rings, and bake it in the rounded earthen or brick ovens, resembling huge ant hills, which may be seen in the rear of many of the houses. The bread thus prepared is commonly called "chipa," and is, at least when fresh, a delicious article of food. The native women make and sell quantities of it in the Asuncion market. In the town of Luque, on the Asuncion and Villa Rica Railroad, they are noted for the fine bread which is made of this flour, and the passengers eagerly purchase it from the women who offer it for sale. I have also seen pastry and sponge cake made of the flour as light and palatable as anything prepared from wheat flour, and I do not know why it may not serve all the purposes for which the latter is used.

If the ground powder is heated upon iron plates and partially cooked, it clusters into hard and irregular lumps, and forms the well-known tapioca of commerce, or, prepared somewhat differently, it becomes the article known in England as "Brazilian arrow-root."

The *Mandioca brava* does not differ much from the *M. dulce* in external botanical characters. Both are stout herbs, growing from five to eight feet high, branching and very foliaceous. Both have their flowers in short axillary racemes, the flowers small, purplish white and nodding, producing a capsular, five-valved fruit, and an acrid, milky juice. The leaves of both species are alternate, on long petioles, palmate, with narrow, deeply-cut lobes. The natives, however, readily distinguish the two species. *M. dulce*, they say, when questioned, has red stems, petioles and leaves, while those of *M. brava* are white. On examination, however, it will be found that this distinction will not always hold good, as *M. dulce* frequently has stems and petioles almost or quite white, while those of *M. brava* are not unfrequently reddish. A much better distinction lies in the shape of the stems, which, in the former case, are nearly or quite terete, while in *M. brava* they are more or less angled; and also in the angle at which the petioles of the two species spring from the stems, rising in *M. dulce* at a right angle, or even sloping downward, and in *M. brava* at an angle of sixty or forty-five degrees. After all, the only satisfactory distinction lies in the juices of the two plants. That of *M. dulce*, as already stated, is sweet and innocuous. That of *M. brava*, on the contrary, is poisonous. The juice of this species has been known to kill cattle if the roots are eaten in the raw state. If, however, the juice is thoroughly squeezed out, and the grated pulp dried, it may be used in making flour and bread, like that of the other species. Indeed, some of the people here tell me that they prefer the bread made from *M. brava* to that made from *M. dulce*. It makes a lighter bread, they say, but I cannot see much difference between them. In Brazil, I believe, the *M. utilissima* is most commonly used in making cassava bread and tapioca, but either species will produce the same result, and certainly *M. dulce* is much the safer of the two. Why two species so closely resembling each other in all external botanical characteristics, growing side by side in the same soil and under the same conditions, should develop such different active principles, is one of the vegetable mysteries which cannot be solved; but that they do is certain. I do not find that the roots of the *M. brava* are ever exposed for sale in the market, though those of *M. dulce* may always be seen in great piles upon the floors and benches of the market-house. The people evidently have a wholesome dread of the poisonous species.

The Mandioca is very prolific. It is grown from slips, and never from seed, so far as I have observed. All one has to do in order to get a field of it is to cut the stem into layers, as is done with sugar-cane, and stick the joints into the ground, where it readily sprouts. I am told that one plant will continue to send out roots for nine or ten years in succession, and even propagate itself in this manner, if not cut off. The roots, which are the only part of the plant used, are from one to two inches thick, and run just beneath the surface of the ground for two or three feet. They have a brownish coat, and a granular, white interior. For table use they are generally taken when about nine or ten inches long, or else broken up into pieces of this length. *Thomas Morong,*

In the Bulletin of the Torrey Botanical Club.

The Redwood Forest.

IN size of individual specimens, the Redwood (*Sequoia sempervirens*) ranks next to its relative, the Big-tree of the Sierra Nevada (*Sequoia gigantea*) and the Eucalyptus of Australia; but if we take the average size of the trees and the density and extent of the forest into consideration, the Redwood is the grandest of the world's forest-trees. It belongs to the Coast Range of northern California. A few straggling groves only are to be found below Monterey Bay, and it does not extend far into Oregon. The largest body commences at the mouth of Russian River and extends into Oregon. Another large forest lies south of San Francisco, in Santa Cruz County. The widest portion of the great or northern body of Redwood timber lies in Mendocino County, between Ukiah and the ocean. Here it is by air line twenty-five miles wide, a vast, unbroken forest with branches extending inward up the cañons. The peculiarity of the Redwood is its love of moisture, which means here fog. The fog banks rise from the Pacific and flow inland like a great level sea of vapor. The lower mountains next the coast are enveloped, and farther on it fills the cañons, leaving the high mountains to rise like islands out of it. Still further inland only the lower portions of the cañons are filled with fog. At times the sea of fog will rise so high that it engulfs nearly the whole section back to the high dividing range of mountains which is the watershed between the streams running directly into the ocean and those which flow into the Russian and Eel Rivers, which extend for a long distance parallel to the coast line. Then the fog goes pouring through the passes in actual rivers of vapor, which run down the cañons toward the interior. Strangely enough, it always returns as it goes.

Now, with this sea of fog in mind one can locate the Redwood belt most accurately. Near the coast on the lower mountains and everywhere, the densest forest is almost exclusively of Redwood. Farther inward sweeps the same dense forest on the lower mountains and in the cañons at the same height. Redwood forest it is still on all the mountains, but of smaller trees, and the greater the elevation the more largely it is mixed with Douglas Spruce (*Pseudotsuga taxifolia*) and the Tan Bark Oak (*Quercus densiflora*). Still farther inland near the watershed spoken of before, Redwood only grows in the cañons, and the mountains are either open grazing-land, covered with Oak and Fir, or with that dense, low growth known as Chemisal (*Adenostoma fascicularis*). Over the watershed, down those cañons where the fog pours over, there still are groves of Redwood, well confined to the moist banks close to the courses of the streams; while up the broad cañons of Eel and Russian Rivers the fogs roll and nourish the life of the grandest of all of the Redwoods till they are held back by the heat of the interior.

The Redwood is not only a lover of moisture, but, to an extent hardly to be believed unless seen, a condenser and conserver of moisture. Their tops reach high into the sea of vapor, and a constant precipitation from them like rain takes place. Last summer I was on the coast during a foggy time, and I remember that while the roads were dry and dusty, in the clearings under the Redwoods the water had been precipitated till it stood in puddles and formed mud holes. This abundance of moisture causes the densest of undergrowth, which only continual fires make passable. Hazels, Huckleberries, various Ceanothus, Ferns of large size and in the greatest profusion, with large bushes of Rhododendron and numerous other plants, make the forest floor a perfect tangle in the moister portions. The list of herbaceous plants here is not large, but they are delicate and beautiful. The glossy leaves of *Vancouveria hexandra* form dense masses; an Orchid, *Goodyera Menzieger*, is common; and in the spring *Trillium ovatum* and the Erythroniums are plentiful and so is the lovely Clintonia.

Of small Ferns, only the beautiful *Adiantum pedatum*, the Maiden-hair, is common; but there are several species of Aspidium and the Woodwardia; and Brake is everywhere, making in the cleared forest a solid mass four or five feet high. I have seen acres of the Brake seven or eight feet high, where a man could only crawl through the tunnel-like paths. Every year or two forest-fires sweep through this forest-tangle, but it springs up again with renewed vigor. The Redwood, unless very young, is not injured by fire. Its thick bark protects it, and often trees will be seen which had every limb stripped by the fire putting out a mass of foliage from top to bottom. No name could be more appropriate than Sempervirens, for it possesses wonderful vitality. A tree cut throws up hundreds of strong sprouts, and a stump is only killed by repeated burning. Fallen trees will often grow along the whole length of the stems, and throw up sprouts from the upturned roots; and I have seen sprouts six or eight feet high from logs. The commonest care would ensure the perpetuity of these grandest of forests.

Ukiah, Cal. *Carl Purdy.*

Vegetation in Central Pennsylvania.

THE unusual mildness of the past winter, coupled with the excessive rains of the summer, have had a marked effect on many of our fruit and ornamental shrubs and trees. The poverty of bloom and general backwardness are conspicuous on every hand. The prospect for fruit is not encouraging. Cherries promise better than any of the other stone fruits, but their blossoms are thin and scattered; and one looks in vain for a single tree—even a Morello—which presents the usual resemblance to a "ball of snow." The ground underneath our finest trees is thickly strewn with the large flower-buds, each of which when opened shows the tell-tale black spot in the centre, although the scales and outer parts have enlarged a little. Peaches present a sorry sight. The older trees have either succumbed entirely, or have lost a large part of their branches, while the young trees show vigorous buds only here and there, the others having so swollen during the mild weather of January that they fell an easy prey to the few cold days of early March. The Peach is no doubt our most unreliable tree. It grows vigorously for a few years, but is strongly inclined to overbear, and unless this is checked by thinning the young fruit—which ought never to be neglected, although it generally is—it succumbs a few years later. Plums are in much better condition, but the blossoms are practically wanting.

Pears show the effect of the winter most plainly, since their large flower buds are easily distinguished, and still remain (May 7th) upon the trees, though shriveled and dying. The large-budded and vigorous growing Asiatic varieties, Mikado, Sha Tea, etc., of our Pear-orchard, are especially marked. They set fruit buds abundantly, but I do not think a single one is now living. Not speaking of the quality of the fruit, these varieties have much to commend them in their rapid growth and beautiful leaves and flowers, but the large, easily coaxed out buds must make their fruiting quite uncertain. The Apples are not yet in bloom, but they have pushed rapidly within the past few days. A considerable proportion of the trees are without flowers, and notably of such reliable kinds as the Crabs, which seldom fail. But the general outlook at present is much better than for any of the other large fruits, and favorable weather and absence from insect attack may fully make up for the scanty bloom.

Of flowering shrubs, the Forsythias, which we have been at some pains to recommend and disseminate from our nursery, present a curious sight. Instead of the profuse bloom which makes it the most conspicuous of our spring shrubs, it has only here and there a single flower, all the others having been nipped in the bud. Akebia, our prettiest twiner, held its leaves last year much longer than usual, and until the time the flower-buds generally begin to swell, but for some weeks thereafter not a sign of life was visible. Now, the first week in May, when it should be full of flowers and the delicate, five-fingered leaves rapidly expanding, there is but a hint of life at wide-scattered intervals, and latent leaf-buds are only slowly waking to the work that is thrown upon them. Early in February its flower-buds were expanded so far that the flowers could be seen. A month later they were dead. A Jackman's Clematis, somewhat sheltered, had young growth an inch and a half long. Tartarian Honeysuckles were also very forward through January and February; but they do not seem to have expended all their stock of buds, and are but little delayed, though the Honeysuckle promises but little bloom.

Naturally, everything which carries flower-buds through the winter suffered, and the larger the buds, the more easily were they deluded by the false hopes of midwinter, and the more easily they fell a prey to the cold weather of March.

State College, Penn. *W. A. Buckhout.*

New or Little Known Plants.

Buckleya distichophylla.

THE French Broad River, one of the most picturesque of the streams which have their source in the Alleghany Mountains, flows along the base of a high limestone cliff just before it passes from North Carolina into Tennessee. This is Paint Rock, on the right bank of the river, and a few miles below the Warm Springs of North Carolina, a well known and much frequented health resort. Paint Rock is divided by a small stream which cuts through it nearly at right angles with the French Broad, into which the smaller stream falls at this point, marking the boundary between the two states. On the steep rocky ledges which rise from the banks of the smaller stream, which, unless it is swollen by freshets, is hardly more than a shallow brook, grows one of the rarest plants in America—*Buckleya distichophylla*, of which the first figure which has appeared is published on page 237 of this issue.

It is an interesting feature of the flora of the southern part of eastern North America that it contains several plants extremely localized; several of them monotypic, like Neviusia and Darbya, others like Shortia and Buckleya, with east Asia representatives hardly to be distinguished from their American prototypes; and others like *Croton Alabamensis* and *Rhus cotonoides* (a true Old World type), representing widely distributed American genera, but themselves very local. Several other plants could be named were it necessary to show more conclusively the changes which time has brought about in the character of our flora, reducing the number of individuals of certain types once widely distributed, if the theory of gradual extermination of certain forms of plants is to be accepted, to a few hundred or a few thousand individuals. Buckleya is one of the rarest of all these plants. The only place where it is known to grow is on the steep rocky ledges of Paint Rock. Here is the last stronghold in America of a very peculiar type, which, as it still exists over a considerable area in Asia, once occupied, it is possible to conceive, a much larger space on the American continent than it does at present. But there are special reasons why this particular plant cannot spread far or very fast from any spot where it had obtained a foothold. The male and female flowers are produced on different individuals, so that fertilization might not be accomplished always easily; and the seed, which ripens and falls in September, when the ground is usually dry and unfit to secure germination, loses its vitality almost immediately by the degeneration of the oily albumen which surrounds the embryo. The branches will not root like those of many plants when they come in contact with the soil, and it does not spread by underground shoots or stolons. The propagation of Buckleya, therefore, is dependent on the seed finding conditions favorable to its immediate germination; and that it does so still sometimes, is shown by the fact that a few seedlings and young plants are scattered among the older individuals; but there are not a great many of these, and one fire of very moderate severity would exterminate *Buckleya distichophylla* from its native locality as completely as *Gordonia Altamaha*, another very local southern plant, has been exterminated from the only spot it is known to have inhabited naturally.

Buckleya distichophylla has been known to botanists for many years. It was discovered by Mr. Thomas Nuttall, who, returning from one of his western journeys, ascended the French Broad in the autumn of 1816, and found this plant, which he referred to the genus Borya. Twenty or thirty years later Paint Rock was visited by Mr. S. B. Buckley, who made many botanical explorations in the southern states, and finally settled in Texas, where he died a few years ago. Dr. Torrey, to whom Buckley sent specimens, determined the true character and relationship of the plant and bestowed upon it the name it bears. Asa Gray appears to have been the next botanist to visit Paint Rock. In 1842, soon after the charge of the Cambridge Botanic Garden was entrusted to him, Dr. Gray made a long journey through the mountain region of the south for the purpose of collecting roots and seeds for the garden. His visit to Paint Rock is interesting because he brought away with him a root of Buckleya, which he planted at Cambridge, where it still flourishes, and which, up to two years ago, was the only individual of this plant in cultivation. For years every effort was made to propagate the Cambridge plant; it bore pistillate flowers only, and so produced no seeds; neither green nor hard wood cuttings would strike; root cuttings failed to grow; layers were unsuccessfully tried year after year; no stock could be found on which it could be grafted successfully, and the experiment of grafting pieces of the roots with the branches, the last resource generally of baffled propagators, was equally unsuccessful. So for nearly forty years the Cambridge plant remained the absolutely unique representative of this genus in cultivation, an instance of rarity of a garden plant without a parallel so far as I can remember, when the period during which it lasted is considered.

A number of botanists have visited Paint Rock of late years, but none of them were there at just the right season to secure young plants or ripe seeds of Buckleya; but in the autumn of 1888 Mr. Canby and I went across the Big Smoky Mountains of Tennessee, and then made a detour to the French Broad for the purpose of looking up Buckleya. Fortunately, we got to Paint Rock just as the ripe fruit, of which there was a great crop, was falling, and we were able to secure several hundred seeds, which were sent home at once, packed in damp soil, and also a number of small seedlings. The seed arrived at the Arboretum in good order and germinated at once. Several of the young plants which we dug up have survived, so that there is now reason to hope that the existence of Buckleya in America may not be dependent on the rather remote chance that the surface of the ledges of Paint Rock may escape a visit of fire, and that the single old plant in Cambridge may last indefinitely.

Mr. Faxon's drawing shows so clearly the structure of the flowers and fruit of Buckleya, which are described in standard works of botany, that nothing more need be said about them now. The plant grows to a height of ten or twelve feet, with slender, graceful, spreading branches, and light green, delicate foliage, which is its chief beauty, the flowers and green fruit being quite inconspicuous. It is a member of the small although widely distributed family of the *Santalaceæ*; and its North American relatives are two shrubs of the southern states, Pyrularia, the Oilnut, and Darbya; and a familiar and common herb of northern woods, *Commandra umbellata*. *C. S. S.*

Foreign Correspondence.

London Letter.

DECORATIVE PALMS.—The number of Palms now grown by nurserymen in England is surprising. They are represented by hundreds of thousands in some of the principal London establishments, and they are said to find a market readily enough to satisfy the growers. The seeds are imported by the bushel and sown, not in pans or boxes, but on beds in low houses where they require little attention and may be forked up and planted with ease. The species most abundantly grown are *Kentia Belmoreana*, *K. Fosteriana* and *K. Canterburyana*, *Areca lutescens*, *Seaforthia elegans*, *Ptychosperma Alexandræ*, *Hyophorbe Verschaffeltii*, *Latania Borbonica* (*Livistona Sinensis*), *Cocos Weddelliana* and *Geonoma gracilis*. These names are those used by the nurserymen and I therefore use them in preference to those favored by botanists. An instance of the difficulties often presented by synonymy in plant names recently came under my notice. A nurseryman who grows *Latania Borbonica* by the thousand sent to Kew

for a plant of *Livistona Sinensis*, which, he said, was unknown to him. These Palms are the easiest of plants to accommodate when young; they may be grown huddled up together in a manner that would be fatal to most plants, and they grow into nice little plants in three years. They can be watered with the hose or large rose watering can, and they may safely be left to the care of a boy or garden laborer. I am informed that many of these English-grown Palms find buyers in America.

Whilst on the subject of Palms I may refer to the very interesting and instructive paper on "Exotic Palms in Florida," by Mr. T. L. Mead (see GARDEN AND FOREST, p. 175). If any one wishes to know how much or how little a knowledge of geographical botany may be expected to assist the cultivator in regard to questions of temperature he cannot do better than study Mr. Mead's report on the effects of from nine to eleven degrees of frost on the plants he enumerates. *Areca sapida*, a native of New Zealand, lost every leaf, whilst *Elaëis Guiniensis* and *Raphia vinifera*, both from the equatorial swamp regions of Africa, were in the one case partly cut back, in the other untouched. Two Palms from the hot, moist climate of the Sechelles—*Latania Commersoni* and *L. Loddigesii*, and *Phœnix paludosa* from the hot swamps of Bengal, were "all unhurt." *Hyophorbe Verschaffeltii* and a Dypsis, both from Mauritius, also escaped serious injury. These Palms are found wild only in the hottest of tropical countries, where frost would be unknown to them, yet they suffer less from frost than many plants, such as the Chilian Guava, the Cape Tecoma, Peaches, Oranges and even Roses, which when wild annually experience at least a little of it.

What are the structural or protoplasmic differences in these plants which account for this extraordinary behavior when exposed to cold? Records such as that by Mr. Mead are of the very greatest value to cultivators. We are only just beginning to get away from the notion that all plants from tropical countries must be grown in a hot-house.

BLUE-FLOWERED CATTLEYA.—The nearest approach to a blue Cattleya is a variety of *C. Lawrenciana* called *Vinckii*, and which is in the collection of Baron Schroeder. It resembles the type in every character except color. The sepals and petals are flushed with lilac, and the reflexed portion of the labellum is colored dull bluish purple. It is more curious than beautiful. The plant appeared in the collection of Monsieur Vinck some three years ago, and it has shown the same peculiar color in its flowers every year since.

DENDROBIUM MACCARTHIÆ.—This magnificent plant is now flowering freely at Kew. It is one of the least common in gardens from the fact of its being bad to cultivate. It is found only in Ceylon, where it is much less plentiful now than it was a few years ago, owing, probably, to the visitations of the Orchid-collector. The Kew plants have this year made pseudo-bulbs over a yard long, and they bear near the top pendulous, three-flowered racemes, each flower being four inches across when fully expanded; the color is pale rosy mauve, with a large blotch of maroon-purple on the lower part of the lip, and streaks of the same color on the front portion. The Kew plants are grown in a very hot, moist stove, where they are kept saturated at all times save when the leaves are falling. It grows all through the winter, the flowers pushing immediately after the leaves have fallen.

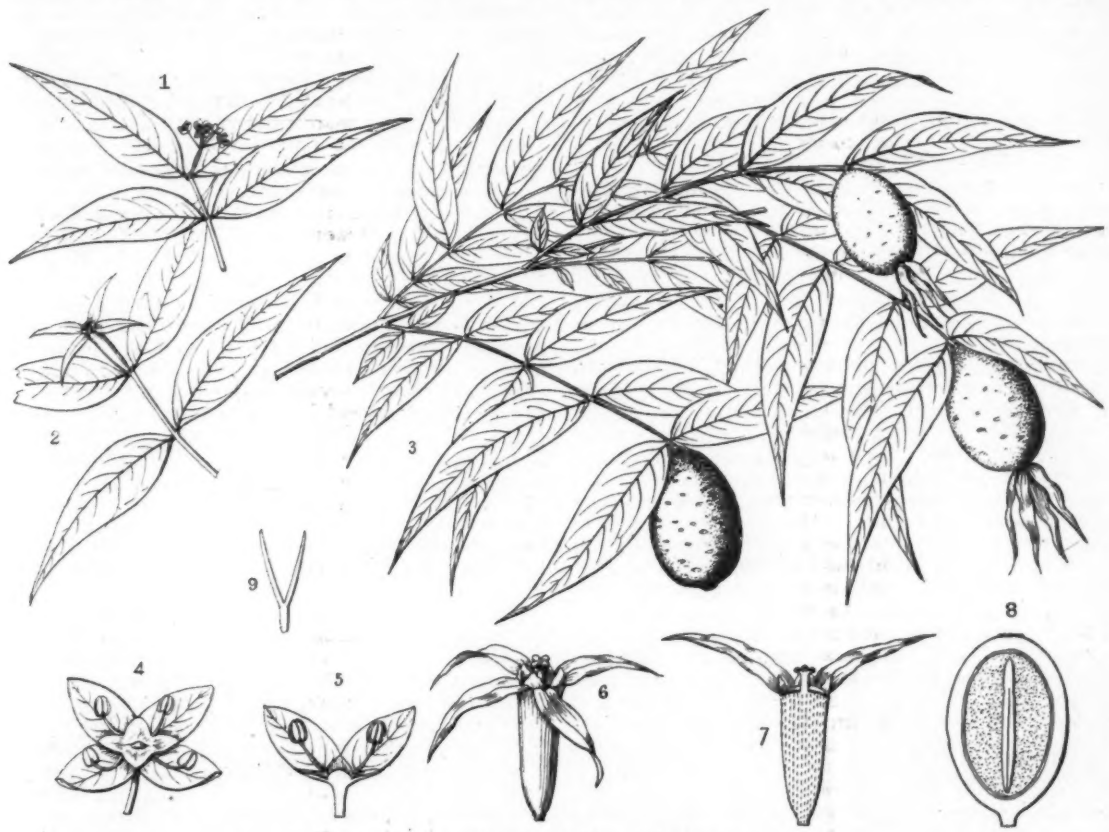

Fig. 37.—Buckleya distichophylla.—See page 236.

1. Flowering branch of the staminate plant, natural size. 2. Flowering branch of the pistillate plant, natural size. 3. Fruiting branch, natural size. 4. Staminate flower, enlarged. 5. Vertical section of a staminate flower, enlarged. 6. Pistillate flower, enlarged. 7. Vertical section of a pistillate flower, enlarged. 8. Vertical section of a seed, somewhat enlarged. 9. Embryo, much magnified.

DISA RACEMOSA.—This new and beautiful cool-house Orchid is again flowering freely at Kew. It grows and increases by means of stolons rapidly. The leaves are tufted, as in *D. grandiflora*, and the scapes are from a foot to eighteen inches high, with large, rosy red flowers. I described this plant last year, and refer to it again now so that Orchid-growers may not overlook it. In my opinion it is almost, if not quite, as good a garden plant as *D. grandiflora*.

ECHIUM CALLITHYRSUM.—A tree-like example of this gigantic Bugloss is now the most attractive plant in the Winter Garden at Kew. It is twelve feet high and as much through, and almost every one of the hundred or so branches is terminated by an erect spike or thyrsus of deep blue flowers, the flower-bearing portion of the strongest spike measuring a foot in length and as much in circumference. This specimen

has been gay with flowers for about three weeks, and it is still a magnificent picture. Of the many species of Echium found in the Canary Islands, this is much the handsomest and most satisfactory as a garden plant in England. Three years ago seeds of over thirty species of Echium were obtained for Kew from Teneriffe, but the plants raised from them were not worth the room they required. *E. callithyrsum* is sometimes called *E. arboreum*. It requires liberal treatment, a position where it will get plenty of sunshine, and it should be planted out, not grown in a pot. I should say that in the warmer parts of your country this species would grow and flower well in the open air.

STATICE.—Many of the species of this genus are found in the same region as the Echiums above mentioned, and they are exceedingly ornamental in flower when well grown. Seeds are easily procured from Teneriffe or Madeira, and plants may be grown from them in two years quite as large as large cabbages, and bearing long, branching scapes of rich blue or blue and red flowers. A few of the smaller species, such as *S. latifolia*, *S. macrophylla*, *S. profusa* and *S. Butcheri*, are grown as greenhouse plants in England. The flowers remain fresh on the plants many weeks; indeed, they are practically everlasting.

London. *W. Watson.*

Cultural Department.

Some Notes on Echinocactus.

THE genus Echinocactus is represented in southern California by a great diversity of forms which nearly approach each other. The *Cactaceæ* are generally recognized as very difficult to study, not, perhaps, because they are characterless, but because of the difficulty of making specimens and the usual lack of material for study. Only by very extended and close field observation can one arrive at correct conclusions relative to species and varieties, and this none of our botanists have yet enjoyed.

Near San Diego the genus is represented by *E. viridescens*, Nutt., usually a low, depressed plant of about thirteen ribs, with pale straw-colored flowers and a slightly acid, pleasant fruit. This is a maritime species or variety almost wholly restricted to the immediate neighborhood of San Diego.

Echinocactus Orcuttii, Engelm., is found a little further to the south and further inland from the coast. It differs in size, the number of ribs (usually twenty-two to thirty), and in the young plants, which are globose. It is inclined to grow in cæspitose clumps of fifteen to twenty cylindrical heads, around which the ribs are often spirally inclined. It seems to form almost a connecting link between *E. viridescens* and *E. cylindraceus*, Engelm., which was originally collected by Dr. Parry on the eastern slopes of the mountains bordering the Colorado Desert, in San Diego County. Dr. Engelmann was at one time inclined to doubt its right to specific rank, as other botanists are still inclined to doubt. In 1882 I found what I determined was this species in the desert cañons of Lower California and also west of the mountains near the San Rafael Valley, and Dr. Engelmann wrote that he concurred with me in that opinion. This Cactus was a fine cylindrical plant, encompassed by a fine network of its slender, recurving white spines, with lemon-yellow flowers.

Echinocactus Lecontei, Engelm., is another species originally credited to the eastern slope of our mountains and to Arizona. Hundreds of plants annually reach the European market under this name, collected within the confines of the Colorado Desert, which differ in only a slight degree from *E. cylindraceus*. This form is more inclined to a grayish color, less flexible spines, and perhaps to a more globose shape. The demand in Europe for this particular species makes it command a higher price than many others, and it was only recently that I learned whence the trade was supplied. As they are collected near the original locality cited for it, no blame can attach to those who endeavor to supply the demand, but I must consider it merely a "trade name" for a form differing in no essential character from other plants yearly sent out under this, the preceding and the following names:

Echinocactus Wislizeni, Engelm., is the oldest name applied to any of these forms of Cacti. Some of the plants received under this name are beautiful, with white spines like those of *E. cylindraceus;* others have exceedingly handsome red spines; still others have dull spines of no special color. In young plants especially the color is very variable, as are also the spines.

Echinocactus Emoryi is the last of our Californian species to receive notice. It more nearly approaches the two first mentioned species, the reddish spines and flowers being usually the most characteristic features. But along with the red-spined and red-flowered plants I have found other varieties—white, green, brown and other shades—until no constant character can be found by which to distinguish between them.

English cacticulturists claim that *E. Orcutti* is identical with the old *E. Californicus*, a name considered synonymous with *E. viridescens* by Dr. Engelmann. A great variety of plants have reached the European market under the latter name, which, considering its natural variations, is not to be wondered at.

I have carefully studied every form in southern and northern Lower California that I have been able to learn of, and I have been forced to the conclusion that only three true species exist within our limits: *E. polycephalus* (belonging to a distinct section of the genus), *E. Wislizeni* and *E. viridescens*. Under *E. Wislizeni* I would class as varieties *E. cylindraceus* and *E. Lecontei;* while under *E. viridescens* I would place *E. Emoryi* and *E. Orcuttii* as sufficiently well-marked varieties. Several other varieties of both these species could be sufficiently distinguished to satisfy the foreign trade. Perhaps these views will not be retained when I become more familiar with Arizona, New Mexico and Mexican forms, but they are certainly in line with the later views of Dr. Engelmann, the greatest authority on the family that we have had. *C. R. Orcutt.*

San Diego, Cal.

Chrysanthemums in Pots.—II.

PINCHING, or stopping, should be done just as it may appear necessary to get the plants bushy and even in shape. The outline of the future plant should be determined as early as July by five or six stakes, adding others as material for training develops. The leaving, or clearing away of suckers, should be regulated in the same way as pinching, and altogether in accordance with the habit of the plant. Early flowering and naturally bushy varieties, such as Hivue Fleuri, Chevalier Domage, Sachem, President Hyde, Souvenir de Mercède, Monsieur Freeman, L. Canning, and pompones generally, require but little pinching, and are, also, better for having the suckers removed. Enchantress, Neesima, Prince Alfred, Fair Maid of Guernsey, Kioto, Belle Paule, M. Delaux, Robert Bottomley and Mr. H. Cannell seem to need some suckers left if shapely specimens are desired. From careful observation I am satisfied that, for specimen plants, suckers produce just as fine flowers as the main stems. For specimen flowers it is absolutely necessary to have all suckers cleared away, and to develop, if possible, the crown-bud at the second break rather than to rely upon those which come away from its base, which are the shoots to produce flowers on a specimen plant.

As soon as the roots are well developed, so that they interlace around the sides of the pots, which should be some time in July, I commence giving liquid manure. I have a hundred-gallon cask partly sunken, which is kept about full of water, and from which I use all the time. At first once in two weeks, and later once a week, I pulverize about two bushels of cow-manure, which is allowed to settle, and the clear top-water used. Just before using I settle every day the ferment which has risen to the surface with a stream of water, and in about a week there is very little trace of solid manure left. For a change, a pail of wood-ashes, a lump of lime or two or three pounds of guano may be added to the mixture. After housing, I gradually diminish the strength of the application until the plants are in bloom, when clear water only is used.

Disbudding should be begun as soon as the superfluous buds can be handled. It is important to concentrate at once all the flower-producing energies of the plants on just the flowers needed to fill out the specimen; but if the "chinch" bug gets at work the best laid plans will avail nothing. I have never heard of an effective remedy against this destructive insect. Disbudding is a work which requires care and skill. If the plants are well filled out—as in the case of such reliable varieties as Golden Band, Minnie Miller, Puritan, Empress of Japan, Hivue Fleuri, Chevalier Domage, Norum Bega, L. Canning, Moonlight and President Hyde—all but the terminal bud may be removed. With some others—such as Robert Bottomley, Mr. H. Cannell, M. Delaux, occasionally, and Fair Maid of Guernsey—for the sake of filling out the specimen, the terminal bud has to be removed, and two or three buds below it allowed to develop.

I prefer to house the plant at the first danger of frost rather than run any risk from chills. A light, airy greenhouse is better than a pit, although I have had some plants do well enough in a pit where they were set up on pots so as to come

The Greendale Oak.—See page 233.

as near the glass as possible. I take the sashes off whenever the weather permits. For mildew I know of no remedy except sulphur, and I use black sulphur for look's sake. To air evenly is the best way to guard against mildew.

If the hose is applied at every favorable opportunity there is little danger of the different kinds of Aphis getting a foothold; except, possibly, the black variety. Dalmatian powder or Tobacco-dust is generally a sufficient remedy. After housing a small, reddish brown, hairless caterpillar (or what seemed to me to resemble a small cut-worm) eat the centres of the flowers. Being scarcely thicker than an ordinary knitting needle and only one-third of an inch long, it was some time before I found these pests secreted amongst a few curled up dead leaves at the base of the plants. The stock plants were stored away until time for taking cuttings, which were placed in an ordinary cutting-bed, when some of the same enemies began to work on them, and gave me enough to do to keep them down. Their numbers increased rapidly, and spread on many other plants. Professor Smith, of the New Jersey Agricultural College, informs me that the pest is the larvæ of some nocturnal moth.

Wellesley, Mass. *T. D. H.*

Roses under Glass.

THE in-door Rose season being now practically over, a few brief notes on the successes and disappointments of the past winter may be of interest. From a Rose-grower's point of view the winter was a trying one, although the temperature was not low; nevertheless, long-continued dull weather and an atmosphere saturated with moisture made careful watching necessary. Some growers attained success, but many others were unable to prevent the gradual depreciation of their stock and were forced to admit that the problem was too deep for them. The disease known among growers as "yellows" was a frequent cause of failure, and, as usual, various opinions were expressed as to its cause and prevention; but it still appears the most reasonable view that the disease is caused by an excess of moisture, either at the root or in the atmosphere, and it is aggravated by too high a temperature at night. It is only fair to state, however, that this opinion is not universally held.

The maintenance of a regular and proper temperature in the Rose-houses has been a matter of considerable difficulty, because the changes of weather have been so frequent that, without the presence of a reliable night-watchman, it was almost impossible to predict the condition of a house over night. This extremely variable weather has, perhaps, been less trying in those establishments where the heating is done by steam, as it is, doubtless, much easier to increase or to reduce the temperature of a house thus heated (provided the house is properly piped) than in one heated by hot water. It may be added, however, that all the good Roses sent to market during the season were not grown by steam heat.

Fashions in roses are changeable. Red roses, for example, were in great demand for several seasons preceding the last, and this was true in New York during the last season; while in Philadelphia red roses were seldom called for, and even so uniformly popular a flower as General Jacqueminot was not sought for with much eagerness. Some good flowers of W. F. Bennett were occasionally seen, but this rose, like American Beauty, does not give entire satisfaction, and appears to require some peculiarities in soil and treatment that are not generally understood.

The Duchess of Albany when first offered took the popular fancy, and found a ready sale, though it is claimed that this rose does not retain the brightness of its coloring after being cut for a time, and if this be proved true it is very doubtful if it will be able to usurp the place of La France. But as the Duchess of Albany has proved a profitable flower during the past winter, it undoubtedly will be largely planted next season, and a thorough comparative test will be given to it. Madame Hoste is established in popular favor, and seems destined to become a standard sort for forcing. Its large buds are of beautiful form, though not very distinct in color, and while it does not make an extra strong growth, it is free flowering, and appears to have a good constitution.

Souvenir of Wootton has created some disappointment, due in a measure to the fact that it was over-rated at the outset, and therefore aroused too high expectations. It is a good grower and a continuous bloomer, and the color is bright and pleasing. It is claimed that some flowers of this variety were produced as large as those of American Beauty, but it was not my good fortune to see them.

Ernest Metz is a Tea Rose, much commended by some growers, and it produces large and handsome pink flowers of good form. It has not been grown largely as yet, but as there are already so many good pink Tea Roses for winter flowering, a new-comer must develop many good qualities to secure a place on the list.

Among Hybrid Perpetuals for forcing there have been few innovations. For early work Anna Alexieff, Anna de Diesbach, Magna Charta and Mrs. John Laing are most prominent. Ulrich Brunner has proved its qualities of color and form, but whether it is sufficiently free-blooming for commercial work remains to be seen.

Captain Christy, when well-grown, is a magnificent rose, but it is seldom seen in quantity, being considered rather shy in blooming. Baroness Rothschild, Merveille de Lyons and Madame Gabriel Luizet especially have all been seen in good condition. Mdlle. Marie Cointet has been tested as a forcing Rose, but did not prove a success, the flowers failing to open properly. Emperor of Morocco, an old Rose, has been forced on a small scale this winter, but while it is a handsome flower it is too dark in color to become very popular, as there is but little demand for very dark roses at any time.

Holmesburg, Pa. *W. H. Taplin.*

Notes on American Plants.

THE Calendine Poppy (*Stylophorum diphyllum*) is now in full bloom. Its dense masses of foliage are of a light green shade, a foot or more high, among which the numerous bright yellow flowers, often two inches wide, are displayed in fine contrast. It is a plant one would notice from a distance, and especially at this season, for its abundance of foliage. A fine and rich soil in open sunlight is what it likes.

Cardamine rhomboidea, var. *purpurea* (Spring Cress), is a charming little plant, about six inches high, which flowers about the same time as the Spring Beauties, and somewhat resembles them in the color of its flowers. They are borne in a cyme and are rose-purple, lasting a week or more. Its natural home is said to be in rich soil along streams from western New York and Pennsylvania to Wisconsin. It certainly deserves a place in every collection of American plants.

It is interesting to note the difference in the flowers of the white variety of the purple Trillium (*T. erectum*, var. *album*) from different localities. We get from Pennsylvania the true var. *Album*, with pure white flowers, as white as those of *T. grandiflorum*. Indeed, a casual observer would take them for the flowers of that plant. From Connecticut we get another form of this variety, which is intermediate between the pure white and the typical *T. erectum*. In the Connecticut form the petals are of a yellowish shade, with a sprinkling of purple. Both forms of the variety and the true purple type all flowering together make an interesting display of this species.

Heuchera Americana (common Alum-root), when stimulated by cultivation, is a valuable plant for its foliage. The root-leaves, which endure through the winter, are often over two inches wide, of a velvety appearance above, and somewhat variegated. This variegation is not so intense, of course, as in many greenhouse plants grown for this reason, but is sufficiently strong to make the leaf very beautiful, and at no season more conspicuous than in early spring as soon as the snow disappears, precisely the time when they would be most appreciated. Later in June, when the long scape has developed its loose panicle of pretty greenish purple flowers, and at a time when it has its greatest number of rivals, it is even then an attractive plant, and its flowers are useful for cutting. Its natural home is in rocky woodlands, and it is, no doubt, a valuable plant for rockeries. Yet it can be grown in any light rich soil in shade or sun. It is, however, probable that a partly shaded situation suits it best.

Jeffersonia diphylla (Twin-leaf, also called Rheumatism-root) is now in flower. Its height is only six or eight inches, and the single white flower, about an inch wide, is of short life and endures about as long as that of a Tigridia. The leaves are on long stems from the root and are curiously separated into two parts. It is an interesting plant for collections. It needs a rich soil and prefers shade.

Southwick, Mass. *F. H. Horsford.*

Hardy Plants for Cut Flowers.—IV.

THE flowers of herbaceous plants often need some additional foliage as a setting to display them to the best advantage. *Ferula communis* is a noble plant, both for the back row of the border and for cutting purposes; the leaves are beautifully divided, of a bright, shining green color, and when the plants get well established are twelve to eighteen inches wide, and are invaluable for arranging with cut flowers. *Gypsophila paniculata* is another plant that is also most useful. The individual flowers are small and inconspicuous, but they are produced on many-branched panicles, which gives them the appearance of fine mist, and when mingled with other flowers in a vase make a charming effect. The Gillenias are pretty native plants that blend well with flowers when cut. Their pretty white flowers are not large, but are borne on a much-branched stem and last a long time. There are two species, *G. trifoliata* and *G. stipulacea*, the one flowering just after the other has done, so that their flowers may be had for several weeks in summer. They should be grown by all who wish useful plants to cut from.

The herbaceous Pæonies are general favorites, the newer varieties many of them are very fragrant, the colors are beautifully blended and are very showy where large effects are needed. It has recently been stated that Pæonies take three years to flower after being moved, but this statement is misleading. Our plants, which include some eighty varieties, were all moved and divided last year in April, and most of them flowered in May and June. It is sometimes said to be best to move Pæonies in fall. This is also open to question, for when shifted at that time they are very liable to be lifted

by the action of frost and their buds injured, in which case they certainly would not flower. If planted in spring before growth commences they will flower just as well, if the operation is carefully performed without injuring the large, tuberous roots.

Pæonies are useful for their flowers and for the large leathery foliage which stands well when cut, but care must be taken not to rob the plants of too many leaves or it will weaken them considerably. *Valeriana officinalis* is an old-fashioned garden plant, with flowers more fragrant than showy. It is very desirable, and does best when divided and replanted early in spring, for with us old plants are liable to die out. *Thermopsis Caroliniana* is attracting some attention as a new plant; there is really nothing new about it, for it has been offered for sale for eight years or more. It is desirable among tall-growing plants for its spikes of yellow Lupine-like flowers. They last a considerable time in water after being cut. The plant is perfectly hardy, but does not like to be disturbed when once planted. Thermopsis, in common with all leguminous plants, should be left undisturbed, because the roots are few and far spreading. The Everlasting Peas, *Lathyrus latifolius* and the white variety, are also impatient of disturbance, owing to the size and length of their roots; but for cutting they are always useful, especially the white variety. These Peas may be planted near fences or screens, and, as they grow rapidly during the summer months, they make a pretty drapery for such places. *Lathyrus grandiflorus* is also desirable, owing to the size of the flowers, which are more than twice as large as those of *L. latifolius*, though there are always fewer of them on a stem. If the Californian *L. splendens* proves hardy in the east it will be an acquisition to gardens.

Passaic, N. J. *E. O. Orpet.*

The Bulb Border.—Now that the Tulips are showing their gay colors, it seems a good time to note that while formal planting may be very well in the parks and on large estates where masses of vivid color are a mere item in the landscape, it does not seem to be quite in the best taste for small gardens, where everything is closely under the eye. One often sees in small gardens the Tulips ranged exactly like the picture in the dealers' catalogues, rising from bare earth in mathematical precision at exactly so many inches apart, and almost smiting one in the face by their glare. Fortunately it is only a brief display; blooming together, they disappear soon with unanimity, and are pulled out unripened, to take their chances in some out-of-the-way corner. A much more satisfactory way for the small grower would seem to be to study his surroundings and secure as long a season of bloom as possible; never any great glare, but a long succession of flowers, with an almost daily change in the appearance of the border, which while perhaps not so impressive to passers by, is more pleasing to one fond of his garden. One can secure numerous varieties of Tulips which bloom at various times during quite two months without going beyond the cheaper sorts which are offered at such a reasonable price every fall. Selections should be made of all the sections—earliest, late, bybloomers, bizarres, parrots, etc.—and it is a very good plan to mix them up so that there will be no tendency to produce effects while planting. If one fancies a mass of some one color, a lot of this may be selected to make a special clump, but the main lot should be planted irregularly, to bloom without formality. Such a bed at first will lack foliage, and it is not until the ground is fairly full of bulbs that there will be a sufficient foil of green to be fully satisfactory, so that it is well to cover the bare earth with some creeper. *Lysimachia nummularia* (Moneywort) with me is very satisfactory for such a purpose, though the commonest of garden plants, being hardy, a free grower and having pleasing foliage; while the foliage of the bulbs is ripening the Lysimachia is a mass of bright yellow bloom, giving color to the border, after which the creeping stems being cut out and decaying foliage removed, the border may be planted over with Tuberous Begonias or some other suitable plants. Such a bed need not be occupied solely with Tulips; clumps of Narcissi make pleasing additions—in the front breadth may be grown such early flowering bulbs as Snowdrop, Crocus, Squills, Winter Aconite, Dwarf Irises, etc.—and it is well to reserve a space as a back border where some tall growing herbaceous plants may be flowered. Canterbury Bells are attractive in such a position. If a fence borders the bed a background may be made of some good climber. For a low fence I know of nothing neater than *Vitis heterophylla*, a beautiful foliaged vine, whose sprays are very useful for cutting.

Androsace sarmentosa is now showing its rosettes of rosy pink flowers, and is a very attractive dwarf plant for the front border or rockery, where it should have good drainage and protection from excessive moisture. It is a Himalayan plant. *A. coronopifolia* is a neat little Russian biennial which has formed a colony on the border from self-sown seeds. It forms small neat rosettes of narrow foliage, and small, white flowers are produced on short scapes. A colony of this in bloom is graceful and pleasing, and well worth growing in the spring garden. It is perfectly hardy, and much better left without protection than grown in a frame, where it is likely to become drawn.

Ranunculus fumariæfolius is a neat, Fumitory-leaved Buttercup, and its plentiful yellow double flowers, about an inch in diameter, on single-flowered scapes, are now very attractive. Golden-yellow flowers are especially welcome in the border in the early spring.

Gold-laced Polyanthuses have made such rich masses of color that, although a short time since I gave the preference to Hybrid Primulas, I am tempted to say that these many flowered Primulas should have a place in every garden also. Besides being rich in color, they have the advantage of long peduncles, and thus are useful for cutting. It is rather odd that the commercial florists who furnish the salesroom and stands with so many plants in the spring do not add good strains of Primulas to their list. They are universally appreciated and probably would find a ready sale.

Aquilegia flabellata is the first Columbine to show flower this season. This is a comparatively new Japanese variety, with broad wedge or fan-like foliage. It is robust and dwarf, the flower scapes, which are radical, being about a foot high. The flowers are fair-sized, with short, hooked spurs, and in color a creamy, slightly greenish white—no trace of other color appears on my flowers, though they are sometimes said to be flushed with violet. The scapes are furnished with from three to four flowers, which are of good substance, but are not as graceful in appearance as good forms of the American Columbines. This species is said to be allied to *A. Sibirica*.

Myosotis alpestris Victoria is a very dwarf, compact Forget-me-not, which in my garden is reliably hardy without protection and excellent for borders. Like the rest of the family, it may readily be had from seed and is increased rapidly by division. Any taste may be satisfied among the numerous varieties of Myosotis, *M. dissitiflora* probably being the most popular species now grown. *G.*

Elizabeth, N. J.

Gathering Asparagus.—In an address before the Michigan Horticultural Society Mr. Charles W. Garfield objects to the use of the knife in the Asparagus-bed, and favors the breaking off of the stems as far below the surface of the ground as they will snap easily. The same advice has been given in these columns more than once. The white underground portion of the stalk is woody and useless, and the knife, unless it is in very careful hands, is likely to injure other buds. It is also good practice to cut every shoot in the bed, large and small. Some gardeners leave the slender shoots, under the impression that the roots will thus be strengthened and bear thick stalks next year. But for some reason this result does not follow. Perhaps some roots invariably bear small shoots, and if so, they should not be favored at the expense of better plants. When all the shoots are cut the strong roots with large stalks have an even chance and overshadow and crowd out the weaker ones.

Bergen, N. J. *S.*

Recent Publications.

Forestry in North America.—II.

Part I. of the volume before us treats of the utility of forests, which the author shows to be twofold. In the first instance, forests are useful indirectly, in influencing the climate, in the distribution of rain-water, in the preservation of the soil on sloping ground, in the binding of moving sands and in affording shelter against winds. All these matters are exhaustively treated. In regard to the climatic influence of forests, the author gives an accurate and most useful summary of the researches which have been made to determine the effect of forest-growth upon the temperature of air and soil, rainfall, humidity and evaporation in Germany, Switzerland and France, mainly by the establishment of parallel stations, one being situated inside a fully stocked wood, and the other at some distance in the adjoining open country.

To illustrate the effect of forest-growth in protecting loose soil on hill-sides, the author mentions the Siwalik Hills, in

India, at the foot of the north-west Himalaya. We quote his words:

"Any one who has ever stood on the hills behind Hushiarpur, in the Punjab, and looked down upon the plain stretched out toward the south-west, has carried away an impression which he is not likely to forget. In that part the Siwalik range consists of an exceedingly friable rock, looking almost like sand baked together. Formerly, the range was covered with a growth of forest-vegetation, but a number of years ago cattle owners settled in it, and under the combined attacks of man, cows, sheep and goats, the natural growth disappeared, while the tread of the beasts tended to loosen the soil. The annual monsoon rains, though not heavy, soon commenced a process of erosion and of carrying away the surface soil. Gradually, small and then large ravines and torrents were formed, which have torn the hill range into the most fantastic shapes, while the débris has been carried into the plains, forming, commencing at the places where the torrents emerge into the plain, fan-shaped accumulations of sand which reach for miles into the plain and which have already covered and rendered sterile extensive areas of formerly fertile fields. Indeed, one of these currents or drifts of sand has actually carried away a portion of the town of Hushiarpur. The evil has by no means reached its maximum extent, and if curative measures are not adopted at an early date, the progress of transporting the hill range into the plain will go on, until the greater part of the fertile plain stretching away from its foot has been rendered sterile."

The author might have added the denuded hills, and the rivers, formerly navigable, but now silted up in the Ratnagiri district of western India, and other similar instances, the counterpart of which is probably not wanting in the drier districts of North America.

Secondly, forests are useful, inasmuch as they furnish timber and other forest-produce. Under this head the author touches upon a question which will be more fully dealt with in a subsequent volume under the financial aspects of forest-management, namely, the relation of the income derived from a forest to the capital value of that forest. By way of illustration the author gives an account of the yield of a Scotch Pine-forest in England on soil of different quality and managed under different lengths of rotation. The capital value of such a property on the best quality of land, if managed on a rotation of 100 years, is stated to amount to £25 per acre for the land and £80 for the growing stock on it, total £105 per acre. Those compartments or portions of the forest on which the timber had attained the age of 100 years would contain 8,390 cubic feet of timber per acre. On the younger portions the growing stock would be less, and the estimated value (£80) is that of the timber standing on all compartments, old and young, calculated per acre all round. In the care of an estate of 1,000 acres the capital value of such a wood would be £105,000. If managed so as to furnish a regular annual yield, such an estate would produce (in the shape of final and intermediate cuttings) per acre per annum 129 cubic feet of timber, estimated to be worth forty-three shillings. Allowing two shillings per acre per annum all round for current expenses, the net income of the estate would amount to £2,050 a year, and this only corresponds to an interest on the capital value of the property of 1.95 per cent. In other words, if the proprietor sold the estate, the land with the timber standing on it, at the estimated rate, he would realize a sum of £105,000, which, if invested at four per cent. in government securities, or in other safe investments, would give him an annual income of £4,200, in the place of £2,050, which the management of the forest would yield. At first sight, therefore, forestry would seem to be a very bad business financially. But there is another side to the question. The proprietor, if he keeps his estate and manages it well, has a good chance of increasing its value. First of all, the soil of a well stocked forest improves steadily and hence the annual yield of such a forest goes on increasing. This steady improvement of land which has been kept continuously under well cared forest and the consequent increase of its timber yield is of great importance. The annual yield per acre of the state forests of the Kingdom of Württemberg (present area, 476,000 acres) has risen steadily, apart from fluctuations, from thirty-nine cubic feet per acre in the ten years 1823-32 to sixty-one cubic feet in the ten years from 1878 to 1887. Further, it is probable that in America the price of timber, and probably also in many cases the selling rate of the land, will rise very considerably. This chance of augmenting the capital value of his property and of increasing his income the proprietor loses when he sells the forest with the timber on it. On the other hand, it may be taken as certain that the interest of government securities will go down, and that it will not in future be possible to invest large amounts safely at four per cent. Lastly, forest-property has this advantage, that if for any special purpose the proprietor requires money, he can obtain it by making extraordinary cuttings without trenching upon his capital and without necessarily diminishing the productive powers of his forest.

In places where small timber finds a ready sale, a shorter rotation, say of fifty years, may be adopted, which means that the timber is cut when about fifty years old. In that case the capital value of the estate would, in the particular instance selected, amount only to £51 an acre (land £25, growing stock £26) with a net annual income of 28—2=26 shillings an acre. In this case the growing stock of those compartments which had attained the age of fifty years would amount to 5,060 cubic feet of timber per acre. On 1,000 acres the capital value of an estate of 1,000 acres thus managed would be £51,000, and the net annual income £1,300, corresponding to interest at the rate of 2.55 per cent. These figures show that under certain circumstances it may be more profitable to work a forest on a shorter rotation. Thus the forests of Spruce and Scotch Pine in the district of Aix-la-Chapelle and other districts of Rhenish Prussia are worked on a rotation of fifty or sixty years, because the coal and other mines in those districts require large quantities of pit-props and other small timber, which gives a ready market for timber of the smaller sizes. And this holds good whether the forests belong to private proprietors, to towns or villages or to the state. On the other hand, the high forests of Oak and Beech in those districts are worked on a longer rotation, because of these kinds the large timber sells best. The state forests of the kingdom of Saxony are mostly worked on a rotation of eighty years, because they chiefly consist of Spruce, which timber in those parts commands a ready market at that age. These forests, which are managed on a very perfect system, comprise an aggregate area of 415,200 acres, and furnished in 1888 a net revenue of £392,270. The capital value of these estates (land and growing stock) is determined from time to time with great care, and it amounted in 1888 to £36 per acre, good and bad, and on this the net revenue of the year amounted to 2.62 per cent. There are, however, among the 110 forest-ranges of these state-forests a good many in which the net revenue of 1888 represented a higher percentage on the present capital value, in some instances more than four per cent.

It was right at the outset prominently to draw attention to these facts, because at first sight they seem to constitute an insuperable obstacle to the introduction of systematic forest-management in the United States. And yet it is probable that in North America the financial results of forestry will be in favor of systematic forest-management. Definite data are not available, and the following remarks are put forward merely by way of illustration. On a map in Professor Sargent's excellent report on the forests of North America, published in 1884, which represents a portion of California, and shows the distribution of the Redwood-forests, a considerable area is marked as containing standing Redwood averaging 200,000 feet (16,660 cubic feet) to the acre. These figures, it is presumed, relate to 1880, but it appears from data communicated by Dr. Mayr that at the time of his visit a few years ago the Redwood forests of California still contained some very heavily timbered lands. On page 267 of his book he gives a graphic description of some untouched woods 700 years old, the trees 275 feet high, and fifty-six stems to the acre, which contained, according to his measurements, the stupendous quantity of 188,000 cubic feet of timber per acre. Very likely, therefore, there are considerable areas of old Redwood-forest left containing much more than 16,660 cubic feet of timber per acre. Assuming, for the sake of argument, that this timber on the spot was worth twenty cents per cubic foot, the value of the standing crop would be $3,330 per acre. Now, if a proprietor of, say, 1,000 acres of such forest were to clear the timber, without regard to the maintenance of the forest, and if he were to place the proceeds at four per cent., he would realize an annual income of $133,000. If he were to manage the forest in a regular manner, with the view of maintaining it in a good state of productiveness, he might expect, judging from the analogy of forests in Europe, to realize a net income of two and a half per cent. on the value of the growing stock, and this would only be $83,000 a year. As land in the case here selected would probably not be salable, its value has here been omitted. It is, however, a question whether the proprietor could at once dispose of $3,330,000 worth of Redwood without lowering the price. If his estate contained 10,000 acres he would certainly have to be satisfied with considerably lower rates in order to complete the transaction at once. It is most probable that he would find it to his advantage to clear the

forest gradually, and in that case it would be far more advantageous at once to undertake a systematic treatment of the forest with the view of obtaining from it a steady annual yield of timber. Apart from the advantages of such a proceeding, which have already been indicated, others will suggest themselves to every practical man who has had experience in timber business on a large scale. It is more economical in the long run to make permanent arrangements for the carriage of timber by land and by water, to build roads, railways, open up streams for floating, than to make temporary arrangements which go to rack and ruin when the forest has been cleared. In a forest worked permanently upon a regular system it may be possible to settle colonies of laborers so as always to have a sufficiently large body of men trained to the work and experienced in it. And in any case the steady and systematic working of a large forest-estate will give the proprietor the benefit of the rise in timber prices which may with certainty be expected to occur in North America.

From Dr. Mayr's book, and from other sources, we know that some of the more important North American timber-trees have an extremely rapid growth. He describes a forest of the Douglas Fir in south Oregon, second growth, eighty years old, the trees 130 feet high, and 320 trees to the acre, which, according to his measurements, contained 58,000 cubic feet of timber. This means that in this forest during the eighty years of its life, on an average, 725 cubic feet were produced annually on one acre. The best Spruce-forests in Germany only accomplish about one-fifth part of this growth. Rapid growth means a large annual yield of timber and a large net income from the forest. It is not impossible that in many forest-districts of North America the financial results of systematic forest-management will be found to be far more favorable than they are in Germany. But in order to reap the benefit of these exceedingly favorable conditions the goose which lays the golden eggs must not be killed.

The remarks made up to this point chiefly relate to matters discussed by Dr. Schlich in the first or general part of his book. Another article will be devoted to the second part of the book, in which the principles of silviculture are set forth.

Bonn, Germany. *D. Brandis.*

Correspondence.

The Decorative Use of Flowers.

To the Editor of GARDEN AND FOREST:

Sir.—The article by Mrs. Wheeler, in GARDEN AND FOREST for January 22d, was so full of suggestion that I venture to supplement it by a few additional thoughts on this fascinating branch of decorative art. It is evident that the use of flowers is increasing, and although some persons are inclined to condemn the extravagance which selects flowers on account of their costliness rather than in accordance with their genuine beauty, it is well to remember that a more harmless kind of luxury could not be chosen.

The true artist in flowers is as truly an educator as the painter, and the crowds which always gather about the best floral arrangements when exhibited testify to the interest they arouse. The designers are rare who meet with the highest success, even in simple attempts—which, by the way, are often the most satisfactory. The art which conceals itself under the guise of simplicity and the power to adapt natural grace and beauty to decorative use are rare gifts. One worker will arrange his Laurel branches so that the curving leaves and little branchlets will present all their native charm, while another will have them bunched and twisted until the beauty of color alone remains. An Ivy screen can have every leaf naturally placed so as to form a perfect background, or the leaves may be inverted and pointing in all directions so as to annoy a lover of beauty as discords do the lovers of music. A not uncommon fault in arrangements of Orchids is that the flowers are upside down.

Skill in choosing suitable materials and making the most of them comes with practice and observation only. All of us who have tried it know how perishable and hard to manage are the fronds of the Maiden-hair Ferns. One of the florists of this city first overcame the difficulty by starting his baskets of flowers with a pot of growing *Adiantum Farleyense* and filling other things about it. The Fern, on its own roots, long preserved its freshness and natural grace of growth and motion.

It is true that an appreciation of form depends upon a more cultivated intelligence than does that of color, and yet the latter is more dependent upon accessories than form is. Light and backgrounds are essential to color, yet we have all enjoyed the waving forms of trees in a dim light, or their graceful branches and large leaves in churches or halls so dark as to appear gloomy. Nothing gives more spirit to a combination than the radiating forms of leaves.

It is often said that green gives freshness and white brilliancy, and both can be used freely. Another principle is that while all colors look well massed by themselves, the powerful ones should be sparingly employed in combination, while the delicate and light colored ones gain by proximity and massing. For instance, a quantity of scarlet Salvia or Geranium, in combination with other reds or purples, will, at the best, appear crude and glaring; but scatter the flowers and have fewer of them mingled with plenty of white and green, and they reveal all their brilliancy. Carnations mass well, and also appear beautiful when seen singly; but Roses, with few exceptions, should show their individuality.

Concerning backgrounds, it is well to note that while nearly all feel their influence few of us think where it comes from. Color is intensified or dulled, concealed or brought out, by their use and form. Dark flowers on light backgrounds, and light on dark, are of course effective, but for our purpose we can change either of them by light colored foliage or that which gives us deep shadows. White flowers can be made beautiful even against a background of their own color by mingling dark foliage with them. Dull reds often enhance the pinks and scarlets, and maroon will sometimes make a dull purple look clear, but these are difficult effects to obtain, and better ones are easily had.

Some of our best decorators owe their success to judgment in selecting floral materials suited to the scenes they are required to adorn, as well as to skill in arranging them. When we buy flowers we can in a measure get those that meet our artistic requirements, but the supply from our own places is often limited, and so on occasion it may be well to prepare the surroundings somewhat before arranging the flowers. The more unobtrusively this is done the happier the result. A vase of yellow Lilies can be helped by being placed upon a stand covered with a blue cloth or having a blue tile top, but a curtain hung behind it of unusual color in some familiar place is likely to be obtrusive. Unusual occasions, however, demand even extraordinary decorations.

Long-stemmed flowers in suitable receptacles are likely to remain the best means of general decoration for a long time to come. Plenty of water preserves their freshness, and the flowers are usually displayed in an effective and natural position. The flower-holders offer us a way for the artistic introduction of color often wanted for the completion of the scene. With the exception of those of clear glass, which allow the stems to be seen, earthen ware in plain colors seems the best. Silver is beautiful and brass often has the effect a frame does on a picture. A dark blue, which is a rare color among flowers, can be introduced in this manner, and is perhaps the most useful color. A deep orange is another color that combines well with many things. Both these are effective in a composition where foliage and growing plants alone are in use. White is usually too glaring and hurts flowers, but there is no color that cannot be effective in some situations. Black is sometimes invaluable. One of our best known florist's workers is fond of repeating the color of his jars in the mass of flowers he fills them with, at times using them of lighter and again of darker tones of color, both being effective.

If we do not attempt anything more elaborate than these examples and restrict ourselves to the use of a few colors, success is likely to be won, although elaborate compositions need not be against the laws of art or canons of taste. An effect that pleases when it can be attained is to repeat the same color in different kinds of flowers, in which case the hue must be exact unless we intend to have shaded effects. Another is to repeat different colors in the same kind of flowers. If we have pink Roses and white ones to arrange in two vases, it is better to have one all white and one all pink, if placed where both are seen at once, rather than mingle the colors so that both arrangements are alike.

Mountainville, N. Y. *John De Wolf.*

Notes.

Achillea argentea really has the silvery leaves its name implies. It seems to be the earliest of the family to bloom, and its white flowers above the neat dwarf foliage are very pleasing.

Wallflowers which were left outside all winter are much more stocky, and came into bloom earlier than those in frames. This might not prove the case in more severe seasons.

Mr. Walker, the largest grower of Daffodils for market in England, states that the flowers should be cut while in bud and be opened in water and heat under glass. As a rule, the buds should be free of the spathe before they are cut, and the very best time for cutting is just as the perianth segments burst open.

The fifteenth annual meeting of the American Association of Nurserymen will be held at the Park Avenue Hotel, in this city, beginning on the 4th of June and continuing for three days. An unusually attractive programme of exercises has been arranged, and papers may be expected from many of the leading authorities in the country upon horticulture, pomology and forestry.

Some years ago seeds of Russian Rhubarb were sent to the State Experiment Station at Amherst, Massachusetts, and plants raised from them matured seed. A number of plants have been produced from this home-grown seed, and the roots, it is said, have been sent out for trial by druggists. It would be interesting to know whether any reports as to the medicinal value of the roots have been made.

The proceedings of the thirty-fifth annual meeting of the Western New York Horticultural Society make a compact pamphlet of nearly 200 pages, filled with valuable suggestions for fruit-growers especially. A very full report of the meeting was given in this journal; but the pamphlet just received once more calls attention to the unusual amount of instructive matter contained in the addresses and discussions.

Southern tomatoes have been greatly interfered with by the frost, and hot-house tomatoes are in good demand at fifty cents a pound. Honey peaches from Florida, the first of the season, are selling for seventy-five cents a dozen. California cherries have just come in; Black Tartarians bring $1.50 a box. New limes bring from fifteen to twenty cents a dozen. Fresh tamarinds are exceedingly fine. Physicians allow invalids to take them after medicines with a disagreeable taste, and they are used largely for flavoring lemonade.

The first part of the twelfth volume of the "Journal of the Royal Horticultural Society" of England has reached us. Reports of the Vegetable Conference and of the Chrysanthemum Centenary Conference, held in London last year, occupy a large proportion of the pages of this part, and contain a large amount of valuable information. The Journal is now one of the most useful of serial horticultural publications, and cannot fail to increase the taste and knowledge of cultivated plants. It is an essential addition to the library of every horticulturist and of every working botanist occupied with the study of cultivated plants.

Professor C. C. Caldwell quotes from Dr. Mueller to the effect that the sugar of the Grape is produced in the leaves; that toward the end of summer the older leaves diminish in activity and only the younger ones make sugar; that leaves some distance beyond the fruit may produce sugar for it, as may also leaves on lateral shoots springing from the fruit-bearing branch, but only when those shoots are above the fruit or close to it. Pruning by cutting off the ends of fruit-bearing branches was found injurious, and by too close pruning fruit was produced having four or five per cent. less sugar than fruit on unpruned branches.

During the past week the flowering Dogwood, the Silverbell (Halesia), the Bladder-nut (Staphylea), the Black Haw, the Sweet Viburnum and the Judas-tree, among our native shrubs and smaller trees, have come into bloom in Central Park. The Lilacs are in full flower, and so are the Kerrias, double and single, Exochorda, Rhodotypus, *Azalea amœna*, the Hawthorns, and many kinds of Prunus. The most interesting among herbaceous plants which have lately come into flower are *Phlox amœna* and *P. divaricata*, *Iris pumila* and its varieties, Houstonia and Bird's-foot Violets. The park was never better kept and never looked more beautiful.

Amelanchier oligocarpa, of which a figure and description were published on page 245 of the first volume of Garden and Forest, proves to be a garden plant of great beauty; and the size it attains in cultivation, the vigor of its growth and the abundance of its flowers are surprising to those persons who have only seen this shrub growing in its home in our far northern forests. Specimens in the Arnold Arboretum are now nearly three feet high and three or four feet across, forming perfectly symmetrical compact bushes, which this year have been covered as with a sheet with their handsome solitary white flowers, which, however, like those of the other species of Amelanchier, are of short duration. This is certainly one of the most desirable of our native plants to introduce into the garden, and when it is better known and its beauty recognized, it is certain to become popular.

On Monday of this week the Flower Mission of this city began the work of its twentieth year by sending great numbers of Apple-blossoms, Lilacs, Pansies, Buttercups and other flowers to the various hospitals and to the sick in tenement-houses. Fifty ladies were present on the first distribution-day, and it is hoped that still more will offer their services in future. The service required is not simply the arranging of the flowers in bouquets, but the delivery of them to the sick, who appreciate the flowers more highly when they receive them directly from the hands of the distributors. Donations of fruit as well as of flowers are requested for this beautiful charity.

In *Agricultural Science* for April, Professor C. M. Weed, of the Ohio Experiment Station, has an interesting note on the use of arsenites for the Plum curculio. Many experiments have been reported in which alternate trees were treated and the sprayed trees yielded as little sound fruit as the others. Mr. Weed points out that the remedy acts mainly by destroying adult beetles that feed on the surface of the fruit and foliage. It need not act upon the beetles when engaged in oviposition nor upon the larvæ after hatching. The beetles from unsprayed trees may deposit eggs on the fruit of sprayed trees, and beetles killed on sprayed trees will lessen the injury on the check trees. A fair test cannot therefore be made with a few trees close together. An examination of the question convinces Professor Weed, however, that in good sized orchards of Cherries, Plums and Apples the arsenites furnish a complete and practical remedy for the curculio.

The apple scab is caused, as is well known, by a parasitic fungus (*Fusicladium dendriticum*). The injury to fruit is often very great, and in neglected orchards the entire crop may prove of no value except for cider. Some careful experiments made by Professor Taft, of the Michigan Agricultural College, showed that the size of apples affected by the scab was reduced by one-tenth on an average, making a loss in bulk, not to speak of the loss in good appearance, of fully a bushel to a tree. Of various remedies tested the most effective was a spray of the so-called "Eau Celeste," somewhat diluted. The mixture is prepared by dissolving two pounds of copper sulphate in hot water in one vessel, and two and a half pounds of carbonate of soda in another. The two solutions are mixed, a pint and a half of ammonia is added, and the whole is diluted to thirty-two gallons. An orchard can be sprayed at a cost of two cents a tree, and the treatment may make the difference between success and failure of the crop.

The unequal effects of the past winter on vegetation in different parts of the country is remarkable. A correspondent describes on another page the condition of the flower-buds of many early flowering-trees in Pennsylvania. In eastern Massachusetts, where the winter was also exceptionally mild and where the thermometer fell to zero once at least during the month of March, Cherry-trees are remarkably full of flowers. The buds of Peach-trees are generally uninjured; Plum-trees are blooming abundantly; there is a great show of flowers on Pear-trees; Apple-buds are uninjured. Forsythias have all flowered as freely as usual, although the flowers have been perhaps rather smaller in size than they were last year. The Chinese Magnolias have all flowered well, although the size of the flowers was reduced by a frost of several degrees which occurred just as the buds were opening. The different Amelanchiers have been unusually full of flowers. Flowers of the Chinese and Japanese Apples are just opening and have never been more abundant. This is true of Thunberg's Barberry, the earliest of the genus to flower, and of Thunberg's Spiræa, the ends of the shoots of which are not more injured than usual. The flowers of *Andromeda floribunda* have never been more abundant or larger or better colored. Those of *Andromeda Japonica* were entirely killed during the winter. The Japanese *Prunus pendula* lost some of its buds, and the flowers which developed have been smaller than usual; while the flower-buds of the Sweet Almond were nearly all killed. On the other hand, the Flowering Dogwood never gave a better promise of flowers than it does this year, although in the latitude of Massachusetts the buds often suffer in severe winters. It is unusual to see Lilacs so covered with flower-buds as they are this season in Massachusetts. The flowers of the Red Maple were uninjured, and the fruit is already half grown, although the late frosts destroyed the flowers of the Silver Maples or most of them. The Norway Maples have flowered profusely, as usual. Rhododendrons and Ghent Azaleas have never before in Massachusetts given such a promise of flowers as they do this spring.